

Proceedings of the New York Entomological Society

(Meetings held in Room 129 of the American Museum of Natural History unless otherwise indicated.)

Meeting of October 2, 1973

The meeting was called to order by Dr. Howard Topoff, President, at 8:10 P.M. 24 members and 19 guests were present.

The minutes of the meeting of Tuesday, May 15, 1973, were approved as read.

Dr. Lawrence Limpel of Yonkers, N.Y., was proposed for Active Membership. His entomological interests are insect control and insect physiology. Mr. Lamar Holsheimer of Portland State College was proposed for Student Membership. His interests are Lepidoptera and Hymenoptera. Ms. Rosa Montes of Pace College was proposed for Student Membership. Her interests are myrmecology and general entomology. Ms. Mercedes Delfinado was proposed for Active Membership; her interests are Diptera and free-living terrestrial mites.

PROGRAM.

After a couple of short announcements by members of the Society Dr. Topoff introduced Dr. Norman Lin who talked about social insects. The title of his paper was "Evolution of Sociality in Insects."

Father Sullivan announced that the speaker for the meeting on October 16, 1973, will be Dr. Louis D. Trombetta, Isaac Albert Research Institute, Kingsbrook Jewish Medical Center. His topic will be: "Abnormal development in *Tenebrio* caused by a juvenile hormone analogy."

PETER MOLLER, *Sec.*

Meeting of October 16, 1973

The meeting was called to order by Dr. Howard Topoff, President, at 8:10 P.M. 7 members and 9 guests were present.

The minutes of the meeting of Tuesday, October 2, 1973, were approved as read.

Ms. Mercedes D. Delfinado, of Albany, N.Y., was elected to Active Membership; her interests are in taxonomy of Diptera and free-living mites. Dr. Lawrence Limpel, of Yonkers, N.Y., was elected to Active Membership; his interests are in insect control and insect physiology. Ms. Rosa M. Montes, of Pace College, was elected to Student Membership. Her interests are in myrmecology and general entomology. Mr. Lamar Holsheimer, of Portland State College, was elected to Student Membership; he is interested in Lepidoptera and Hymenoptera.

Ms. Betty Lane Faber, of New Brunswick, N.J., was proposed for Active Membership. She is interested in insect behavior. Mr. S. M. Ulagaraj, of the University of Florida, was proposed for Student Membership; he is interested in behavior and bionomics of Orthoptera. Mr. Henry M. Knizeski, Jr., of Fordham University, N.Y., was proposed for Student Membership; he is interested in systematics and ecology in Hymenoptera. Mr. Charles William Calmbacher, of Fordham University, N.Y., was proposed for Student Membership. His interests are in Hymenoptera, systematics, and ethology of Sphecidae. Mr. James Wangberg, of University of Idaho, was proposed for Student Membership.

PROGRAM.

Father Sullivan introduced Dr. Louis D. Trombetta, of the Isaac Albert Research Institute of Kingsbrook Jewish Medical Center. Dr. Trombetta presented a fascinating paper on "Abnormal Development in *Tenebrio* caused by a juvenile hormone analog."

The first meeting in November was cancelled because of Election Day.

Father Sullivan announced that the speaker for the meeting on November 20, 1973, will be the Society's own secretary, Dr. Peter Moller, of the Department of Psychology, Hunter College, and the Department of Animal Behavior, American Museum of Natural History. His topic will be: "How does a spider find its way home?"

The meeting was adjourned at 9:20 P.M.

PETER MOLLER, Sec.

THE EFFECTS OF A JUVENILE HORMONE ANALOG ON THE DEVELOPMENT OF THE ANTENNA OF *TENEBRIO MOLITOR*

The developmental morphology and histology of the antenna of *Tenebrio molitor* as well as its musculature were described and compared with antennae of insects treated with a juvenile hormone analog. The juvenile hormone analog was code labeled JM-1-46 (4-Ethylphenyl 2-(2-Etoxy Etoxy)Ethyl Acetal). It was topically applied with a microliter syringe to the frontoclypeal suture of the pupa at a dose concentration of $3\mu\text{g}/\mu\text{l}$ of acetone.

Three extrinsic antennal muscles and three intrinsic antennal muscles were described. The intrinsic antennal muscles all originated on the same surface of the scape.

The histology of the adult antenna revealed that the cuticle of the newly emerged insect was composed of two layers, the exocuticle and endocuticle, separated in some regions by a mesocuticle that alters considerably during the first week of development. The cuticle of the intersegmental membrane consisted of two layers that were continuous with the endocuticle. The epidermis was a simple epithelium that varied from cuboidal- to columnar-shaped cells, depending on the location and density of the underlying nervous tissue. The changes in the epidermis from the newly emerged to the one-week-old insect were described. Johnston's organ and an antennal blood vessel were also described. The antennal nervous and respiratory systems were similar to those in other insects, and the changes that occurred in these systems from the newly emerged to the one-week-old insect were described.

The morphogenesis of the antenna was divided into three stages, each of which was marked by specific characteristics in the developmental sequence. The early stage extended for the first four days after the larval-pupal molt, the intermediate stage continued through days 5,6,7 postpupation, and the late stage was days 8 through 12. The cuticle, epidermis, nervous system, tracheae, and blood vessel were described histologically at the larval-pupal molt, 24 and 48 hours postpupation, and 7 and 12 days postpupation. All the above structures were shown to undergo significant alterations during development.

Contrasted to the above findings were insects treated with the juvenile hormone analog. The development of the antenna of a treated insect determined the degree of muscle development. The antennal pupal case was very delicate and much thinner than the normal one and had the same sensory structures that were present on the normal pupal cuticle. The antennae of the treated insects showed four different morphological conditions. First, the antenna of the adult resembled the antenna at the larval-pupal molt, but was highly convoluted and had a very irregular cuticle. The cuticle was said to be juvenilized. Second, the antenna had both juvenilized regions and regions that appeared adultlike. Third, the distal

segments of the antenna were rounded in a manner not characteristic of the adults. Juvenalized patches of cuticle were scattered over the antennal surface. Fourth, two pupal cases were covering the antenna. The outer case resembled the original pupal case but the inner one was not as well defined.

Two general histological patterns were described for the treated antennae. The first pattern was for antennae where the cuticle appeared morphologically pupal and the second pattern was for antennae of insects where the cuticle appeared morphologically adultlike. A few aberrant antennal forms unlike the above were described.

Reversal of metamorphosis by juvenile hormone as stated by some previous investigators was shown to be unlikely. Rather, it seems more probable that the juvenile hormone analog acts upon the cell nucleus to produce abnormal characteristics.

LOUIS D. TROMBETTA
Kingsbrook Jewish Medical Center

Meeting of November 20, 1973

The meeting was called to order by Dr. Howard Topoff, President, at 8:10 P.M. 15 members and 15 guests were present.

The minutes of the meeting of October 16, 1973, were approved as read.

The following membership elections were held:

Mr. Henry M. Knizeski of Fordham University was elected to Student Membership. He is interested in the systematics and ecology of Hymenoptera.

Mr. Charles W. Calmbacher of Fordham University was elected to Student Membership. Mr. Calmbacher works on the systematics and ethology of the hymenopterous family Sphecidae.

Mr. S. M. Ulagaraj of the University of Florida at Gainesville, who specializes in the behavior and bionomics of Orthoptera, and Mr. James Wangberg of the University of Idaho, were elected to Student Membership.

Ms. Betty L. Faber of New Brunswick, New Jersey, whose main interest is behavior, was proposed for Active Membership.

PROGRAM. Dr. Topoff introduced Dr. Peter Moller of the Department of Animal Behavior of the American Museum of Natural History. Dr. Moller, our Secretary, was greeted with vigorous and sustained applause. His talk provided us with brilliant and provocative answers to the question "How does a spider find its way home?" Making effective use of slides and other illustrative material, he considered various aspects of aranean orientation behavior. The lecture was followed by prolonged and heated debate.

Our next meeting is scheduled for December 4, 1973, at which time Dr. David C. Rentz of the Department of Entomology of the Academy of Natural Sciences of Philadelphia will consider the question of mechanical reproductive isolating mechanisms in a talk entitled "The lock and key as an isolating mechanism in katydid."

The meeting was adjourned at 9:30 P.M.

CHARLES C. PORTER, *Asst. Sec.*

Meeting of December 4, 1973

The meeting was called to order by Dr. Howard Topoff, President, at 8:15 P.M. 10 members and 5 guests were present.

The minutes of the meeting of November 20, 1973, were approved as read.

PROGRAM. Father Sullivan introduced Dr. David C. Rentz, Department of Entomology, Philadelphia Academy of Natural Sciences, who told us briefly about his experiences as president of the Philadelphia Entomological Society before he started his interesting talk about "The lock and key as an isolating mechanism in katydid's." His talk was followed by a lengthy discussion.

Father Sullivan announced that the speaker for the next meeting on December 18 will be Dr. Ross H. Arnett, Department of Biology, Siena College. He will talk about "Pollen-feeding beetles."

The meeting was adjourned at 9:10 P.M.

PETER MOLLER, *Sec.*

Meeting of December 18, 1973

The meeting was called to order by Dr. Howard Topoff, President at 8:20 P.M. 12 members and 7 guests were present.

The minutes of the meeting of December 4, 1973, were approved as read.

Mr. Alberto Muyschondt of San Salvador was proposed for Active Membership. His entomological interests are Rhopalocera of Tropical America.

PROGRAM. Father Sullivan introduced Dr. Ross H. Arnett, Department of Biology, Siena College. In a fascinating talk illustrated with color slides Dr. Arnett introduced his audience to the phenomenon of "pollen-feeding beetles." A very interesting and heated discussion followed.

It was announced that the next meeting will be held on January 15, 1974. The speaker will be Mr. Frederick H. Miller, Jr., Nassau County Medical Center, who will talk about "The scanning electron microscope—A tool for entomologists."

The meeting was adjourned at 9:45 P.M.

Secretary's note: For the records it should be mentioned that this meeting was the last one chaired by President Howard Topoff, who, after two years of office, leaves the ranks of officers in the New York Entomological Society. The Society is grateful for his many innovations and hard work.

PETER MOLLER, *Sec.*

THE ROLE OF POLLEN FEEDING IN COLONIZATION OF SMALL POPULATIONS WITH PARTICULAR REFERENCE TO COLEOPTERA

An understanding of some of the problems of small populations of colonizing species has been gained through a study of the role of pollen feeding by quantitative experimental ecological population studies. Selected species of oedemerid beetles, all obligate pollen

feeders, and all well-known taxonomically, have been studied in particular, along with other pollen-feeding beetles in general, by field experimentation involving population sampling, feeding experiments, and karyotype determination.

Many plants suffer very heavy predispersal pollen predation by a large variety of animals. In spite of the generally held view that insects are the responsible and required pollinators for many plants, it is certain that most of the produced pollen in these and other, noninsect pollinated plants goes as insect food without any self- or cross-pollination. In fact, some plants develop feeding anthers that produce a degenerate pollen used solely for food consumption. The development of these special pollen-feeding, nonpollinating structures, the chemical secretions used as attractants, and the ethological patterns in beetles that make this a mutual relationship are very poorly understood.

Oedemerid beetles are ideally suited for such studies because: 1) They are now relatively well known taxonomically through the previous research on the group by this investigator; 2) the breeding populations of almost all the species are very small, and there is abundant evidence to show that they are actively colonizing; and 3) they are all obligate pollen feeders with a specialized pollen rumen used when pollen foraging.

Two things are clear from the sketchy studies made of the pollen-feeding phenomenon: It is 1) a highly evolved chemical, structural, and ethological process, and 2) a large and important but as yet not fully exploited field of study. This, coupled with the need to know more about the factors operating during colonization attempts, has resulted in the accumulation of a wealth of data, but many questions remain unanswered.

ROSS H. ARNETT, JR.
Siena College